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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| EXAMINER |
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ORTIZ RODRIGUEZ, CARLOS R

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| ART UNIT | PAPER NUMBER |
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2125

DATE MAILED: 05/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|---|---|--|
| Office Action Summary | Application No. 09/921,786 | Applicant(s) DREVILLON ET AL. | |
| | Examiner Carlos Ortiz-Rodriguez | Art Unit 2125 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kildemo et al., "Real time control of the growth of silicon alloy multilayers by multiwavelength ellipsometry"; Thin Solid Films, Vol. 290-291; Dec. 1996; pages 46-50, in view of M. Kildemo et al., "A direct robust feedback method for growth control of optical coatings by multiwavelength ellipsometry"; Thin Solid Films, Vol. 313-314; Dec. 1998; pages 484-489.

With respect to claim 1, Kildemo et al. (pub date 1996) discloses a method for real-time control of the fabrication of a thin-film structure comprising a substrate by ellipsometric measurement(see abstract lines 1 and 2)

in which: variables directly linked to the ellipsometric ratio $\rho = \tan \Psi \exp(i\Delta)$ are measured(see pg.47, col.1 line 10);

and the said variables are compared with reference values(see pg.46, col.2 lines 3 and 4).

But, Kildemo et al. (pub date 1996) fails to clearly disclose details regarding the length of the path traveled at a time t in the plane of the variables with respect to an initial point at time $t_{sub.0}$, for each layer participating in the thin-film structure.

However, M. Kildemo et al. (pub. 1998) discloses that the comparison relates to the length of the path traveled at a time t in the plane of the variables with respect to an initial point at time $t_{sub.0}$, for each layer participating in the thin-film structure (see pg. 486 col.1 lines 23- bottom of page).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Kildemo et al. (pub date 1996) and combining it with the invention disclosed by M. Kildemo et al. (pub. date 1998). The results of this combination would lead to, method for real-time control of the fabrication of a thin-film structure by ellipsometric measurement.

One of ordinary skill in the art would have been motivated to do this combination because it is common in the art to use the length of the path traveled to determine the end of the i th layer as disclosed by Kildemo et al. (pub date 1996).

With respect to claim 2-10, 12-27 and 30-31, Kildemo et al. (pub date 1996) in combination with M. Kildemo et al. (pub. date 1998) disclose all the limitations regarding base claim 1. Kildemo et al. (pub date 1996) further discloses:

- a control method, characterized in that the said variables are a combination of the parameters Ψ and Δ . (see equation 1) .

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- a control method, characterized in that the said variables are a combination of trigonometric functions of the parameters .PSI. and .DELTA.(see equation 1).
- a control method, characterized in that the ellipsometric measurement is one with phase modulation (see pg.50, col.2 line 9).
- a control method, characterized in that the measured variables are, respectively:
 $I_{sub.s} = (\sin 2.PSI. \sin .DELTA.)$ and $I_{sub.c} = (\sin 2.PSI. \cos .DELTA.)$ or $I_{sub.c} = \cos 2.PSI.$ (see pg.47, col.1, equation 1).
- a control method, characterized in that the ellipsometric measurement is carried out using the method called "rotating polarizer" method (see Fig 1).
- a control method, characterized in that the measured variables are $\tan.PSI.$ (see pg.47 line 10) and $\cos .DELTA.$ (see equation 1, also see Fig.1).
- a control method, characterized in that the ellipsometric measurement is a multiwavelength measurement (see abstract line 1).
- a control method, characterized in that the reference values form a theoretically determined path (see Fig 5).

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- a control method, characterized in that the reference values form an experimentally determined path (see pg 46, col.2 line 4).
- the reference values are determined by measurement, using measurement of known layers and of the thin-film structure to be controlled(see page 46 col 1 paragraph 2,

Regarding claims 11,28 and 29, Kildemo et al.(pub date 1996) in combination with M. Kildemo et al. (pub. date 1998) disclose all the limitations regarding base claims 1,2 and 3. M. Kildemo et al. (pub date 1998) further discloses: the reference values are discrete points corresponding to the instants of fabrication of the thin layers with respect to the time t_0 (see fig 1).

Regarding claims 13,32 –33, Kildemo et al.(pub date 1996) in combination with M. Kildemo et al. (pub. date 1998) disclose all the limitations regarding base claims 1,2 and 3. M. Kildemo et al. (pub date 1998) further discloses that the reference values are determined by measurement, using measurement of known layers and of the thin-film structure to be controlled(see page 484 introduction lines 9-16 and page 485 col 1 third paragraph.)

Response to Arguments

Applicant's arguments filed 11/3/03 have been fully considered. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the length of the trajectory path traveled in the plane of the variables is measured and a *comparison in real time is made between the experimental and theoretical trajectories*) are not recited in for example rejected claim 1. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims.

It should be noted that claims are examined given the broadest reasonable interpretation.

The claim language provides for a comparison that merely *relates* to something (the length of the path traveled...) but does not specify how and what is being compared. Additionally, claim 1 (for example) states "variables *directly linked* to ...", without specifying which are the exact variables involved. Claim 1 furthermore states "said variables are compared" but since no specific variables were specified it is impossible to determine which variables are compared.

Citation of Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to method for real-time control of the fabrication of a thin-film structure by ellipsometric measurement:

- a. U.S. Pat. No. 5,042,951 to Gold et al., which discloses high resolution ellipsometric apparatus.
- b. U.S. Pat. No. 5,223,356 to Kumar et al., which discloses photocrosslinked second order nonlinear optical polymers.
- c. U.S. Pat. No. 5,494,697 to Blayo et al., which discloses process for fabricating a device using an ellipsometric technique.
- d. U.S. Pat. No. 6,081,334 to Grimbergen et al., which discloses endpoint detection for semiconductor processes.
- e. U.S. Pat. No. 6,504,608 to Hallmeyer et al., which discloses optical measurement arrangement and method for inclination measurement.

The following publication is cited to further show the state of the art with respect to method for real-time control of the fabrication of a thin-film structure by ellipsometric measurement:

- f. EP0653621A1 which discloses a process for fabricating a device using an ellipsometric technique.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Ortiz-Rodriguez whose telephone number is (703) 305-8009. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo P. Picard can be reached on (703) 308-0538. The central official fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Respectfully,

Carlos Ortiz-Rodriguez
Patent Examiner
Art Unit 2125

A handwritten signature in black ink, appearing to read "L. P. Picard". The signature is written in a cursive, flowing style with a long horizontal stroke extending to the right.

cror

April 30, 2004

LEO PICARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100